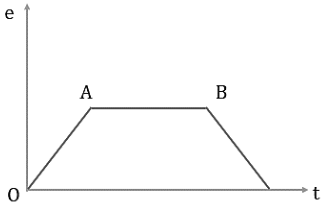
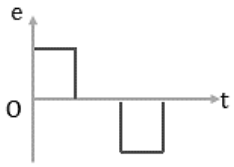
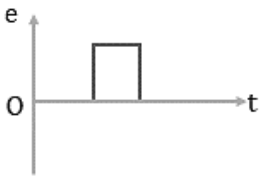
Q.1 Magnetic flux (**ϕ**) linked through the coil changes with respect to time (**t**) according to following graph, then induced emf (**e**) v/s time(**t**) graph for coil is:



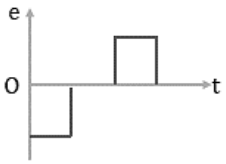
(A)



(B)

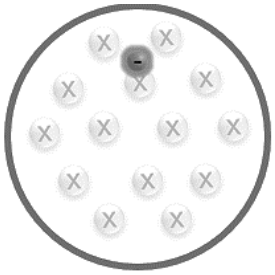


(C)



(D)

Q.2 The figure shows a uniform magnetic field **B** confined to a cylindrical volume and is increasing at a constant rate. The instantaneous acceleration experienced by an electron placed at **P** is



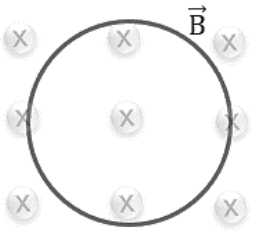
(A) Zero **(B)**Towards right **(C)**Towards left **(D)**Upwards

Q.3 Select the incorrect option in regards to the properties of induced electric field.

(A) It exists in a closed loop **(B)** It is conservative in nature

(C) It follows $\vec{F} = q\vec{E}$ relation **(D)**none of the above

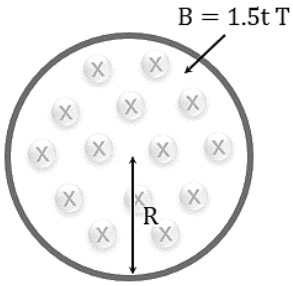
Q.4 The magnetic field is increasing at a constant rate through a wire loop, as shown in the figure. What is the direction of the induced electric field in the loop?



(A) Clockwise **(B)**Anticlockwise

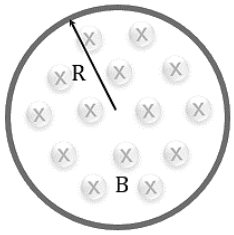
(C) First anticlockwise then clockwise **(D)**First clockwise then anticlockwise

Q.5 A magnetic field $\mathbf{B = 1.5t\ T}$ exists in a cylindrical region of radius $\mathbf{R = 25\ cm}$ as shown in the figure. What will be the magnitude of the induced electric field at a distance of $\mathbf{0.2\ m}$ from the axis of the cylinder?

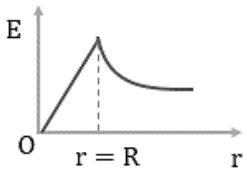


(A) 0.5 N/m **(B)** 0.5 N/m **(C)** 0.3 N/m **(D)** 0.15 N/m

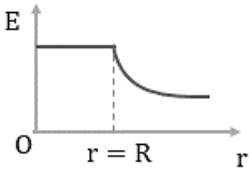
Q.6 A cylindrical space of radius **R** is filled with a uniform magnetic induction **B** parallel to the axis of the cylinder. If **B** changes at a constant rate, the graph showing the variation of induced electric field with distance **r** from the axis of cylinder is



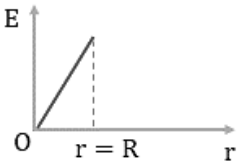
(A)



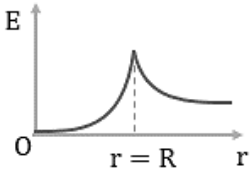
(B)



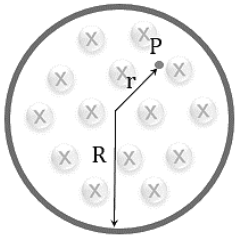
(C)



(D)



Q.7 For the situation described in the figure, the magnetic field changes with time according to, $\mathbf{B = (2.00t^3 - 4.00t^2 + 0.8)\ T}$. What is the magnitude of electric field at point $\mathbf{P_1}$ when $\mathbf{t0.02\ s}$ and$\mathbf{r_1 = 0.02\ m}$.



(A) 1 N/C **(B)** 2.5 N/C **(C)** 3 N/C **(D)** 0.3 N/C

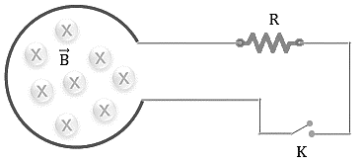
Q.8 In a long straight solenoid with number of turns per unit length **n**, current varies as **I A/s**. Find the magnitude of induced electric field strength inside the solenoid as a function of distance **r** from the axis of the solenoid.

(A) $\mu_0 nIr$ **(B)** $\frac{\mu_0 nIr}{2}$ **(C)** $\frac{\mu_0 nIr}{3}$ **(D)** $2\mu_0 nIr$

Q.9 A long solenoid has **1000** turns per unit length, radius **0.5 m** and carries a current **2 A** is kept in a gravity free region. From its axis at a distance **0.2 m**, an electron is placed. If the current in the solenoid is suddenly switched off, find the velocity attained by the electron.

(A) $4.41 \times 10^7\ ms^{-1}$ **(B)** $8.82 \times 10^7\ ms^{-1}$ **(C)** $2.2 \times 10^7\ ms^{-1}$ **(D)** $1.12 \times 10^7\ ms^{-1}$

Q.10 The figure shows a circular loop of radius **r** and a resistor of resistance **R**. A variable magnetic field, $\mathbf{B = B_0 e^{-t}}$ where $\mathbf{B_0}$ is a constant and **t** is time, is established inside the loop. If the key **K** is closed at $\mathbf{t = 0}$, the electrical power developed just after closing the switch is –



(A) $\frac{B_0^2 \pi^2 r}{R}$ **(B)** $\frac{B_0^2 \pi^2 r^2}{R}$ **(C)** $\frac{B_0^2 \pi^2 r^3}{R}$ **(D)** $\frac{B_0^2 \pi^2 r^4}{R}$

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
Sol.	(C)	(B)	(B)	(B)	(D)	(A)	(D)	(B)	(A)	(D)